d) a user interface connected to the processor comprising at least an output device capable of issuing an alert to a user;

e) a tone detector connected to the port, the tone detector comprising an input for receiving a signal from the telephony connection and a discriminator for identifying a

5 signal indicative of a waiting call; and

f) an alert generator connected to the tone detector and configured to alert a user of the computer via the interface that a call waiting signal has been detected;

whereby upon the alert being generated, the waiting call can be taken at the telephony terminal.

10 In yet a further aspect there is provided a telecommunications network comprising a plurality of interconnected exchanges, at least one of the exchanges including a call waiting signal generator for generating a call waiting signal when a call is placed to an endpoint at which an existing call is in progress, and an endpoint connected to the one of the exchanges, the endpoint comprising a computer system connected to the exchange and a telephony terminal

15 connected to the exchange, wherein the computer system comprises:

a) a port for connection to the exchange;

b) a processor;

c) a telecommunications manager for managing the transfer of data between the processor and the port;

20 d) a user interface connected to the processor comprising at least an output device capable of issuing an alert to a user;

e) a tone detector connected to the port, the tone detector comprising an input for receiving a signal from the telephony connection and a discriminator for identifying a signal indicative of a waiting call; and

f)   an alert generator connected to the tone detector and configured to alert a user of the
        computer via the interface that a call waiting signal has been detected;

whereby upon the alert being generated, the waiting call can be taken at the telephony
terminal.

5   Preferably, the computer further comprises a call control signal generator for outputting a call
        control signal to the exchange, and the exchange further includes a call manager responsive
        to the call control signal to control the handling of the waiting call and/or the data session.

Brief Description of the Drawings

The invention will now be further illustrated by the following description of embodiments
10   thereof given by way of example only with reference to the accompanying drawings, in
        which:

        Fig. 1 is a flowchart illustrating the operation of a preferred method of the
invention; and

        Fig. 2 is a block diagram of a computer system according to the invention which
15   includes an inventive call waiting indicator.

Detailed description of preferred embodiments

In Fig. 1 there is shown a flowchart which implements a method of the invention, and which
illustrates the operation of a PC card and associated software according to the invention
running on a computer. Fig. 1 will be described with additional reference to Fig. 2, which is
20   a block diagram of the computer system.

The invention is used when the computer is involved in a first telephony call which is
typically a data call, step 10, such as an Internet session in which a user employs a PC 50
(Fig. 2) having a browser 52, a user interface 54 (typically including a monitor 56, speaker
25   58, mouse 60 and keyboard 62), and a CPU and operating system 64, all of which are well
        known in the art.

The computer receives and sends signals via call management software 66 which implements a communications protocol such as TCP/IP to communicate with remote computers via the PSTN 68. The call management software connects to a port of the computer, such as a serial port 70 to which a modem 72 is connected. Modem 72 converts signals between the digital signals generated by the computer and the analog signals carried over the PSTN 68. The modem connects into a junction box 74 which also has a conventional handset 76 connected to it, so that the same telephony connection can be used for both voice calls from the handset and data calls from the computer (the data calls from the computer could also be voice over IP (VoIP) calls made via the Internet, in which case the computer would have VoIP software and a microphone or an attached ethernet set).

In addition to the conventional components described above, the computer system according to the invention includes a PC card 78 mounted in a PCMCIA card slot 80. The card 78 includes a telephony connection which is also connected to the junction box 74 so that it receives all of the signals passing to and from the PSTN system (both from the modem 72 and the handset 76).

A tone detector 82 is embodied in the firmware of the card 78 and is adapted to receive and recognise the electrical signals corresponding to call waiting tones of the type generated by suitable exchanges and which are normally converted by a telephone such as handset 76 into an audible beep signal which enables a caller at the handset to switch between calls. In the present invention, the tone detector is configured by a PC card configuration program 84 with the identity of the tones which are to be monitored for (whether by a user choosing the tones or by the software using the location information stored on the computer to decide on the type of tone expected for the PSTN system to which the computer is connected).

Thus, when the data call is in progress, the PC card is activated and the tone detector begins to monitor signals travelling across the line from the PSTN system, step 12. It does this by sampling the signals received from the PSTN, and using a matching algorithm to detect a match between the received signal and the characteristic signal expected for the "call waiting" signal which it has been configured to detect.